

1 Here are the Cadmium Result from the Fred Meyer parking lot across from Bullseye. The sites name is "Portland - Powell & Twenty Second" or PPT

sample date	Beryllium (ng/m3)	Beryllium uncertainty	Emerald Green Chromium (ng/m3)	Chromium uncertainty	Purple & A "decoloring" agent Manganese (ng/m3)	Manganese uncertainty	Blue-Violet Cobalt (ng/m3)	Cobalt uncertainty	Violet Nickel (ng/m3)	Nickel uncertainty	Arsenic (ng/m3)	Arsenic uncertainty	Reds Selenium (ng/m3)	Selenium uncertainty	Yellow Cadmium (ng/m3)	Cadmium uncertainty	Yellow Lead (ng/m3)	Lead uncertainty
10/6/15	0.062	0.0061	406.7	34.4	50.5	1.33	2.3	0.0846	17.0	0.2680	75.0	3.7634	9.8	0.6484	13.0	0.0692	66.9	0.7344
10/7/15	0.012	0.0012	20.2	1.7	35.3	0.93	0.3	0.0115	3.4	0.0541	3.0	0.1511	4.1	0.3371	2.2	0.0119	5.9	0.0644
10/9/15	0.018	0.0018	24.4	2.1	13.1	0.35	0.9	0.0323	8.3	0.1315	8.8	0.4432	45.6	2.6106	13.8	0.0736	7.6	0.0830
10/10/15	0.007	0.0007	24.9	2.1	4.0	0.11	0.3	0.0102	2.3	0.0365	20.3	1.0176	3.0	0.2761	195.4	1.0413	5.4	0.0594
10/12/15	0.015	0.0015	25.5	2.2	14.2	0.37	0.9	0.0333	8.0	0.1267	20.1	1.0087	13.2	0.8369	8.6	0.0457	32.5	0.3566
10/14/15	0.008	0.0008	19.0	1.6	18.3	0.48	0.1	0.0040	1.4	0.0220	1.1	0.0577	0.0	0.0791	1.6	0.0085	2.2	0.0247
10/15/15	0.030	0.0029	17.4	1.5	44.2	1.17	0.4	0.0158	3.5	0.0555	1.1	0.0576	0.0	0.0710	2.7	0.0144	6.3	0.0687
10/17/15	0.012	0.0012	21.0	1.8	8.2	0.22	0.2	0.0085	2.9	0.0461	7.7	0.3848	0.8	0.1551	1.5	0.0079	10.1	0.1114
10/18/15	0.008	0.0008	20.1	1.7	8.0	0.21	0.4	0.0136	7.4	0.1166	6.7	0.3387	8.3	0.5670	4.4	0.0238	7.6	0.0830
10/20/15	0.008	0.0008	21.4	1.8	13.1	0.35	0.3	0.0126	2.9	0.0455	14.8	0.7439	12.3	0.7843	6.5	0.0347	16.7	0.1835
10/21/15	0.020	0.0020	22.8	1.9	24.2	0.64	1.1	0.0405	6.8	0.1074	101.1	5.0736	13.0	0.8230	11.6	0.0621	60.7	0.6664
10/23/15	0.013	0.0013	23.3	2.0	27.7	0.73	0.3	0.0099	4.3	0.0678	3.0	0.1527	0.0	0.1033	0.8	0.0042	5.2	0.0566
10/24/15	0.029	0.0028	439.5	37.1	23.5	0.62	0.8	0.0302	7.1	0.1120	3.5	0.1775	2.7	0.2620	1.1	0.0059	8.1	0.0895
10/26/15	0.010	0.0010	48.0	4.1	7.2	0.19	3.5	0.1302	1.9	0.0306	60.4	3.0297	271.1	14.9439	132.9	0.7080	67.3	0.7388
10/27/15	0.019	0.0019	24.4	2.1	21.1	0.56	0.8	0.0286	9.2	0.1449	15.9	0.7998	15.6	0.9696	10.8	0.0574	10.2	0.1122
10/29/15	0.009	0.0009	37.7	3.2	6.0	0.16	2.8	0.1047	4.6	0.0726	93.2	4.6749	220.0	12.1456	56.9	0.3029	248.3	2.7267
10/30/15	0.007	0.0007	38.5	3.3	3.4	0.09	0.4	0.0150	1.4	0.0226	97.3	4.8796	136.5	7.5815	41.7	0.2221	124.4	1.3659
11/2/15	0.007	0.0007	52.6	4.4	13.3	0.35	0.7	0.0255	5.0	0.0787	38.3	1.9210	41.4	2.3789	24.3	0.1298	87.6	0.9616
average	0.016	0.002	69.119	5.841	18.469	0.487	0.909	0.034	5.556	0.088	31.205	1.566	42.718	2.446	28.367	1.041	42.484	0.467
Maximum	0.062	0.006	439.507	37.142	50.502	1.332	3.477	0.130	16.990	0.268	101.117	5.074	271.121	14.944	195.425	1.041	248.297	2.727

2 Summary of PPT data without the uncertainties

sample date	Chromium (ng/m3)	Cobalt (ng/m3)	Arsenic (ng/m3)	Selenium (ng/m3)	Cadmium (ng/m3)	Lead (ng/m3)	Nickel (ng/m3)	Manganese (ng/m3)	Beryllium (ng/m3)
10/6/15	406.7	2.3	75.0	9.8	13.0	66.9	17.0	50.5	0.062
10/7/15	20.2	0.3	3.0	4.1	2.2	5.9	3.4	35.3	0.012
10/9/15	24.4	0.9	8.8	45.6	13.8	7.6	8.3	13.1	0.018
10/10/15	24.9	0.3	20.3	3.0	195.4	5.4	2.3	4.0	0.007
10/12/15	25.5	0.9	20.1	13.2	8.6	32.5	8.0	14.2	0.015
10/14/15	19.0	0.1	1.1	0.0	1.6	2.2	1.4	18.3	0.008
10/15/15	17.4	0.4	1.1	0.0	2.7	6.3	3.5	44.2	0.030
10/17/15	21.0	0.2	7.7	0.8	1.5	10.1	2.9	8.2	0.012
10/18/15	20.1	0.4	6.7	8.3	4.4	7.6	7.4	8.0	0.008
10/20/15	21.4	0.3	14.8	12.3	6.5	16.7	2.9	13.1	0.008
10/21/15	22.8	1.1	101.1	13.0	11.6	60.7	6.8	24.2	0.020
10/23/15	23.3	0.3	3.0	0.0	0.8	5.2	4.3	27.7	0.013
10/24/15	439.5	0.8	3.5	2.7	1.1	8.1	7.1	23.5	0.029
10/26/15	48.0	3.5	60.4	271.1	132.9	67.3	1.9	7.2	0.010
10/27/15	24.4	0.8	15.9	15.6	10.8	10.2	9.2	21.1	0.019
10/29/15	37.7	2.8	93.2	220.0	56.9	248.3	4.6	6.0	0.009
10/30/15	38.5	0.4	97.3	136.5	41.7	124.4	1.4	3.4	0.007
11/2/15	52.6	0.7	38.3	41.4	24.3	87.6	5.0	13.3	0.007
Average	71.5	0.9	31.7	44.3	29.4	42.9	5.4	18.6	0.016

3 Portland N. Roselawn (PNR) Metals data from October 2014 (for comparison). The 2015 data is not out yet.

PNR	Chromium (ng/m3(LC))	Cobalt (ng/m3(LC))	Arsenic (ng/m3(LC))	Selenium (ng/m3(LC))	Cadmium (ng/m3(LC))	Lead (ng/m3(LC))	Nickel (ng/m3(LC))	Manganese (ng/m3(LC))	Beryllium (ng/m3(LC))
10/2/2014	1.86	0.215	2.59	2.1	1.95	7.92	2.94	49.2	0.002
10/8/2014	1.06	0.131	0.622	0.165	0.066	2.47	2.4	31.7	0.002
10/14/2014	0.347	0.076	1.3	0.894	1.18	2.89	0.321	1.99	0.0007
10/20/2014	0.568	0.053	1.32	2.39	2.78	4.69	0.735	1.92	0.0004
10/26/2014	0.261	0.025	0.721	1.83	2.49	1.14	0.857	1.02	0.0006
Average	0.8192	0.1	1.3	1.5	1.7	3.8	1.45	17.2	0.0011

4 Difference between PPT and PNR

PPT-PNR	70.7	0.8	30.4	42.8	27.7	39.1	4.0	1.5	0.015
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5 ambient benchmark concentrations

	Chromium (ng/m3(LC))	Cobalt (ng/m3(LC))	Arsenic (ng/m3(LC))	Selenium (ng/m3(LC))	Cadmium (ng/m3(LC))	Lead (ng/m3(LC))	Nickel (ng/m3(LC))	Manganese (ng/m3(LC))	Beryllium (ng/m3(LC))
EPA RSLs	0.012 (VI)	100	0.2	21,000	1.6	150	11	90	0.4
						0.0068 (lead chromate)			5.8 (nickel subsulfide)

Comments about this work sheet:

- a. In October 2015, DEQ and Reed College performed air toxics metals monitoring in the Fred Meyers HQ parking lot near SE Powel and SE 22nd Avenue in Portland (AKA PPT)
- b. The samples were collected on 47mm Teflon filters, at 16.7 LPM, through a PM10 preseperator. The samples were collected from midnight to midnight.
- c. The filters were sent to Desert Research Institute for ICP-MS analysis.
- d. The results are show in the following spreadsheets:
 - 1 "Metals Conc PPT and PNR" are the metals concentrations for Oct 2015 for PPT and Oct 2014 for Portland N. Roselawn (PNR). The ambient benchmark concentrations are also included
 - 2 "colors" is a table and a link to what metals are used for colors for glass manufacturing
 - 3 "QC" are the primary and duplicate samples, and the field blanks
 - 4 analysis flags are the flags definitions provided by DRI
 - 5 "Concentration Filter data" is the spreadsheet where I divided the filter mass by the sample volume for PPT
 - 6 Volumes are the filter volume and date information from DEQ
 - 7 "ICPMS data" are the filter mass and uncertainty data from DRI

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Metals	Color
Antimony Oxides	White
Cadmium Sulfide	Yellow
Carbon Oxides	Amber Brown
Chromic Oxide	Emerald Green
Cobalt Oxide	Blue-Violet
Copper Compounds	Blue, Green, Red
Gold Chloride	Red
Iron Oxide	Greens and Browns
Lead Compounds	Yellow
Manganese Dioxide	Purple
Manganese Dioxide	A "decoloring" agent
Nickel Oxide	Violet
Selenium Oxide	Reds
Sodium Nitrate	A "decoloring" agent
Sulfur	Yellow-Amber
Tin Compounds	White
Uranium Oxide	Fluorescent Yellow, Green

<http://geology.com/articles/color-in-glass.shtml>

Table 3

Validation Flag	Sub Flag	Description
b		Blank.
	b1	Field/-dynamic blank.
	b2	Laboratory blank.
	b3	Distilled-deionized water blank.
	b4	Method blank.
	b5	Extract/-solution blank.
	b6	Transport blank.
c		Analysis result reprocessed or recalculated.
	c1	XRF spectrum reprocessed using manually adjusted background.
	c2	XRF spectrum reprocessed using interactive deconvolution.
d		Sample dropped.
f		Filter damaged or ripped.
	f1	Filter damaged, outside of analysis area.
	f2	Filter damaged, within analysis area.
	f3	Filter wrinkled.
	f4	Filter stuck to PetriSlide.
	f5	Teflon membrane separated from support ring.
	f6	Pinholes in filter.
g		Filter deposit damaged.
	g1	Deposit scratched or scraped, causing a thin line in the deposit.
	g2	Deposit smudged, causing a large area of deposit to be displaced.
	g3	Filter deposit side down in PetriSlide.
	g4	Part of deposit appears to have fallen off; particles on inside of PetriSlide.
	g5	Ungloved finger touched filter.
	g6	Gloved finger touched filter.
h		Filter holder assembly problem.
	h1	Deposit not centered.
	h2	Sampled on wrong side of filter.
	h4	Filter support grid upside down- deposit has widely spaced stripes or grid pattern.
	h5	Two filters in PetriSlide- analyzed separately.
i		Inhomogeneous sample deposit.
	i1	Evidence of impaction - deposit heavier in center of filter.
	i2	Random areas of darker or lighter deposit on filter.
	i3	Light colored deposit with dark specks.
	i4	Non-uniform deposit near edge - possible air leak.
m		Analysis results affected by matrix effect.
	m1	Organic/elemental carbon split undetermined due to an apparent color change of non-carbon particles during analysis; all measured carbon reported as organic.
	m2	Non-white (red) carbon punch after carbon analysis, indicative of mineral particles in deposit.
	m3	A non-typical, but valid, laser response was observed during TOR analysis. This phenomena may result in increased uncertainty of the organic/elemental carbon split. Total carbon measurements are likely unaffected.
	m4	FID drift quality control failure
	m5	Non-white (grey) carbon punch after carbon analysis.
n		Foreign substance on sample.
	n1	Insects on deposit, removed before analysis.
	n2	Insects on deposit, not all removed.
	n3	Metallic particles observed on deposit.
	n4	Many particles on deposit much larger than cut point of inlet.
	n5	Fibers or fuzz on filter.
	n6	Oily-looking droplets on filter.
	n7	Shiny substance on filter.
	n8	Particles on back of filter.
	n9	Discoloration on deposit.
q		Standard.
	q1	Quality control standard.
	q2	Externally prepared quality control standard.
	q3	Second type of externally prepared quality control standard.
	q4	Calibration standard.
r		Replicate analysis.
	r1	First replicate analysis on the same analyzer.
	r2	Second replicate analysis on the same analyzer.
	r3	Third replicate analysis on the same analyzer.
	r4	Sample re-analysis.
	r5	Replicate on different analyzer.
	r6	Sample re-extraction and re-analysis.
	r7	Sample re-analyzed with same result, original value used.
s		Suspect analysis result.
v		Invalid (void) analysis result.
	v1	Quality control standard check exceeded $\pm 10\%$ of specified concentration range.
	v2	Replicate analysis failed acceptable limit specified in SOP.
	v3	Potential contamination.
	v4	Concentration out of expected range.
	v5	Instrument hardware error
	v6	Operator error
	v7	Instrument software error
w		Wet Sample.
	w1	Deposit spotted from water drops.
y		Data normalized
	y1	XRF data normalized to a sulfate/sulfur ratio of three
	y2	Each species reported as a percentage of the measured species sum

Sample Number	Equipment S/N	Set up Date & Time	Sample Date & Time	Total Run Time	Flow Rate (lpm)	Volume (M ³)	Retrieval Date & Time	Sample Type	Valid/Void	Operator Initials	
52211	720	11-Oct-2015 18:28	12-Oct-2015 0:01	1440	16.7	24.04	13-Oct-2015 10:22	Both	valid	JB/MK	24.048
52212	685	11-Oct-2015 18:22	12-Oct-2015 0:01	1440	16.7	24.04	13-Oct-2015 10:17	P2	valid	JB/MK	
52213	720	31-Oct-2015 16:43	2-Nov-2015 0:01	1440	16.7	24.04	3-Nov-2015 13:23	Both	valid	JB/MK	
52214	720	25-Jan-1900 11:26	27-Oct-2015 0:01	1440	16.7	24.04	28-Oct-2015 18:03	P2	valid	JB/MK	
52215	720	19-Oct-2015 16:55	21-Oct-2015 0:01	1440	16.7	24.04	22-Oct-2015 11:23	P2	valid	JB/MK	
52216	685	16-Oct-2015	NA NA	NA	NA	NA	16-Oct-2015	P1	valid	JB/MK/CBM	Field Blank
52217	720	16-Oct-2015 14:41	18-Oct-2015 0:01	1440	16.7	24.04	19-Oct-2015 16:53	P2	valid	JB/MK	
52218	685	25-Oct-2015 11:23	26-Oct-2015 0:01	1440	16.7	24.04	28-Oct-2015 17:58	P1	valid	JB/MK	
52219	685	28-Oct-2015 18:01	29-Oct-2015 0:01	1440	16.7	24.04	31-Oct-2015 16:35	P1	valid	JB/MK	
52220	720	5-Oct-2015 14:18	7-Oct-2015 0:01	1440	16.7	24.04	8-Oct-2015 12:35	P2	valid	JB/MK	
52221	685	8-Oct-2015 12:37	9-Oct-2015 0:01	1440	16.7	24.04	11-Oct-2015 18:19	P1	valid	JB/MK	
52222	720	22-Oct-2015 11:28	24-Oct-2015 0:01	1440	16.7	24.04	25-Oct-2015 11:25	P2	valid	JB/MK	
52224	685	16-Oct-2015 14:39	17-Oct-2015 0:01	1440	16.7	24.04	19-Oct-2015 16:49	P1	valid	JB/MK/CBM	
52225	685	31-Oct-2015 16:38	2-Nov-2015 0:01	-----	16.7	Max Load	2-Nov-2015 13:20	Both	void	JB/MK	
52226	685	5-Oct-2015 14:15	6-Oct-2015 0:01	1440	16.7	24.04	8-Oct-2015 12:31	P1	valid	JB/MK	
52227	720	28-Oct-2015 18:05	30-Oct-2015 0:01	1440	16.7	24.04	31-Oct-2015 16:41	P2	valid	JB/MK	
52228	685	19-Oct-2015 16:51	20-Oct-2015 0:01	1440	16.7	24.04	22-Oct-2015 11:21	P1	valid	JB/MK	
52229	685	22-Oct-2015 11:24	23-Oct-2015 0:01	1440	16.7	24.04	25-Oct-2015 11:20	P1	valid	JB/MK	
52230	685	13-Oct-2015 10:19	14-Oct-2015 0:01	1440	16.7	24.04	16-Oct-2015 14:13	P1	valid	JB/MK	
52231	720	8-Oct-2015 12:47	10-Oct-2015 0:01	1440	16.7	24.04	11-Oct-2015 18:25	P2	valid	JB/MK	
52232	720	13-Oct-2015 10:24	15-Oct-2015 0:01	1440	16.7	24.04	16-Oct-2015 14:35	P2	valid	JB/MK	

TD	ELPF	BEPC	BEPU	CRPC	CRPU	MNPC	MNPU	COPC	COPU	NPC	NPU	ASPC	ASPU	SEPC	SEPU	CDPC	CDPU	PBPC	PBPU	COMMENT
F52211	#####	#####	#####	0.612148	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52212	#####	#####	#####	0.625653	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52213	#####	#####	#####	1.263408	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52214	#####	#####	#####	0.585933	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52215	#####	#####	#####	0.548455	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52216	#####	#####	#####	0.422585	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52217	#####	#####	#####	0.482091	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52218	#####	#####	#####	1.153036	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52219	#####	#####	#####	0.305409	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52220	#####	#####	#####	0.485409	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52221	#####	#####	#####	0.587165	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52222	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52224	#####	#####	#####	0.504936	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52225	#####	#####	#####	0.469061	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52226	#####	#####	#####	9.777139	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52227	#####	#####	#####	0.926390	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52228	#####	#####	#####	0.513931	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52229	#####	#####	#####	0.561294	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52230	#####	#####	#####	0.456096	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52231	#####	#####	#####	0.598764	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
F52232	#####	#####	#####	0.418755	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####

micrograms per filter
TD Teflon filter ID
ELPF ICP Analysis flag
BEPC Beryllium Filter mass (ug/filter)
BEPU Beryllium Filter mass (ug/filter) uncertainty
CRPC Chromium Filter mass (ug/filter)
CRPU Chromium Filter mass (ug/filter) uncertainty
MNPC Manganese Filter mass (ug/filter)
MNPU Manganese Filter mass (ug/filter) uncertainty
COPC Cobalt Filter mass (ug/filter)
COPU Cobalt Filter mass (ug/filter) uncertainty
NPC Nickel Filter mass (ug/filter)
NPU Nickel Filter mass (ug/filter) uncertainty
ASPC Arsenic Filter mass (ug/filter)
ASPU Arsenic Filter mass (ug/filter) uncertainty
SEPC Selenium Filter mass (ug/filter)
SEPU Selenium Filter mass (ug/filter) uncertainty
CDPC Cadmium Filter mass (ug/filter)
CDPU Cadmium Filter mass (ug/filter) uncertainty
PBPC Lead Filter mass (ug/filter)
PBPU Lead Filter mass (ug/filter) uncertainty
COMMENT